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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,994	03/05/2002	Noriyuki Yamamoto	900-420	4459

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EXAMINER

CREPEAU, JONATHAN

ART UNIT PAPER NUMBER

1745

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/087,994

Applicant(s)

YAMAMOTO ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5,9,10,12,13,25,28,30,32 and 34-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5,9,10,12,13,25,28,30,32,34 and 35 is/are allowed.
- 6) ☒ Claim(s) 36-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 5, 9, 10, 12, 13, 25, 28, 30, 32, 34, 35 and newly added claims 36-43. Claims 5, 9, 10, 12, 13, 25, 28, 30, 32, 34, and 35 are allowed. Claims 36-43 are newly rejected under 35 USC 103 and claims 42 and 43 are newly rejected under 35 USC 112, first paragraph as necessitated by amendment. Accordingly, this action is made final.

Claim Rejections - 35 USC § 112

2. Claims 42 and 43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 42 recites that "the biochemical catalyst comprising one or more material(s) selected from methanol, formaldehyde, and formic acid." The application as originally filed does not support the recitation that the *catalyst* comprises the claimed species (rather, it is the fuel). Correction is required.

Claim Rejections - 35 USC § 103

3. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (*Applied Biochem. and Bioeng.*, 1983) in view of Meacher et al (U.S. Patent 5,858,569).

In the abstract, Suzuki teaches fuel cells employing immobilized *Clostridium butyricum* for hydrogen production. The fuel may comprise formic acid, among other materials (see p. 292). As shown in Figure 8, a filter (2) containing the *C. butyricum* cells is upstream of the fuel cell.

Suzuki does not expressly teach the structure of the fuel cell as recited in claims 40 and 41; i.e., that the electrolyte is a polymer electrolyte membrane, that the fuel cell comprises a housing, or that anode-side and cathode-side current collectors sandwich the anode and cathode therebetween and spaces are provided between the anode-side supply inlet and the anode collector and between the anode-side collector and anode.

Meacher et al. is directed to a polymer electrolyte fuel cell comprising a housing (12) (see col. 5, line 24) and planar fuel cell units comprising grooved separator plates (see Figs. 3A and 3B).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the fuel cell of Meacher et al. as the fuel cell of Suzuki. At column 3, line 65 et seq., Meacher et al. list a number of objects of their inventive fuel cell, including reduced weight, reduced cost, and reduced volume. Accordingly, the artisan would be sufficiently motivated to use the fuel cell of Meacher et al. as the fuel cell of Suzuki. Further, it is submitted that the structure of the fuel cell

of Meacher et al. meets all of the instantly claimed limitations. In particular, since the anode and cathode-side current collectors (separators) contain grooves as shown in Figs. 3A and 3B, such grooves correspond to the claimed space between the anode-side collector and the anode. As such, the subject matter of claims 40 and 41 would be rendered obvious.

4. Claims 36-39, 42, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al in view of Meacher et al as applied to claims 40 and 41 above, and further in view of Patel et al (U.S. Patent 4,567,117).

The combination of Suzuki and Meacher et al does not expressly teach that the anode-side collector serves as the layer containing the biochemical catalyst, as recited in the instant claims.

Patel et al. is directed to a fuel cell containing an internal reforming catalyst located on the grooves of the separator plates.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Patel et al. to locate the *C. butyricum* catalyst of Sukuki into the grooves of the separator plate (anode-side current collector). The Patel reference is considered to be analogous art to the claimed invention because the reference and the instant invention are both concerned with the formation of hydrogen from a feedstock. In column 3, line 38, Patel et al. teach that

“[i]t is an object of the present invention to provide an improved fuel cell catalyst member and practice for in situ reforming of process fuels.” Therefore, the artisan would be motivated to perform an *in situ* biochemical reforming reaction in the fuel cell of Suzuki by locating the catalyst in the grooves of the current collector in hopes of increasing the performance thereof. As such, the subject matter of claims 36-39, 42, and 43 would be rendered obvious.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

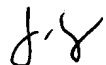
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299.

The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Primary Examiner
Art Unit 1745
November 1, 2006